(1D)

USSR
ELECTRONIC AND PRECISION EQUIPMENT

Number 10 **5 June 1959**

Prepared by

Foreign Documents Division
CENTRAL INTELLIGENCE AGENCY
2430 E. St., N. W., Washington 25, D.C.

Approved For Release 1999/08/25 : CIA-RDP78-03107A000100020010-8

PLEASE NOTE

This report presents unevaluated information selected from Russian-language publications as indicated. It is produced and disseminated as an aid to United States Government research.

USSR ELECTRONIC AND PRECISION EQUIPMENT

Table of Contents

		Page
I.	Items of Special Interest	1
	A. State Committee for Automation and Machine Building	1
	B. Electronics in Instrument Making	1
	C. Aircraft Instruments	1
	D. New Galvanic Dry Cells	2
	E. Schools for Radio Assemblers	3
	F. Plants	3
	G. Defective Camera	4
	H. Voltage Converter for Battery Radios	4
	I. Ozone Air Freshener	5
II.	Local Production and Organization	6
	A. RSFSR	6
	B. Armenian SSR	6
	C. Georgian SSR	8
	D. Azerbaydzhan SSR	9
	E. Lithuanian SSR	9
	F. Kazakh SSR	9
III.	Electronic Equipment	10
	A. General	10
	B. Radio	13
	C. Television	16
	D. Telephones	19
	E. Components	19
	F. Prices	20

		Page
IV.	Computers	21
V.	Instruments	25
	A. General	25
	B. Industrial Controls	26
	C. Electrical Instruments	29
	D. Geophysical Apparatus	30
	E. Medical Equipment	31
	F. Testing Equipment	31
	G. Watchmaking	32
VI.	Photographic and Motion-Picture Equipment	33
VII.	Electrical Products	36

Approved For Release 1999/08/25 : CIA-RDP78-03107A000100020010-8

I. ITEMS OF SPECIAL INTEREST

A. State Committee for Automation and Machine Building

In economic administrative regions, the sovnarkhozes and their technical and economic councils should organize work concerning mechanization and automation. The recently created State Committee for Automation and Machine Building of the Council of Ministers USSR will coordinate all the work in the country concerned with the development and introduction of mechanization and automation, and will see to it that the principal technical bases of mechanization and automation -- namely, machine building and instrument making -- are developed correspondingly. (Moscow, Mekhanizatsiya i Avtomatizatsiya Proizvodstva, Mar 59, p 5)

B. Electronics in Instrument Making

With the development of radioelectronics, the barriers between groups of instruments, such as control and measuring instruments, automatic regulators, computing devices, telemechanical equipment, and other control equipment, are breaking down. Limitations on speed, precision, flexibility, reliability, and distance are disappearing. Automation production of the future will be thought of as complete manufacturing systems controlled by central radioelectronic machines.

In 1957, radio engineering production in the USSR was 18 times that of 1943. In 1957 alone, 450 new products were put into production. The production of electronic, ion, and semiconductor components, and also radio components, is approximately doubled each year. These components satisfy the needs of both the radio and instrument making industries.

Magnetic and semiconductor components are important rivals of vacuum tubes. New ion, dielectric, electroluminescent, radioactive, superconductive, and other components have been developed and will prove to be of great importance in the future.

(Source gives additional information on electronics in instrument making.) (Moscow, Priborostroyeniye, Mar 59, p 7)

C. Aircraft Instruments

Although aviation technology is progressing rapidly, the supply of control and measuring equipment for outfitting aircraft is still behind current requirements. The radio industry still produces an insufficient amount of small, compact control and measuring equipment. Sometimes rather poor instruments must be used. For example, the standard signal generators, which are one of the basic kinds of instruments used for checking the radio equipment of aircraft, are extremely heavy and require highly stable power sources.

Many instruments for measuring resistance, inductance, etc. are produced industrially, but they are very unsuitable in operation.

The instruments for checking radio stations and radio compasses are deficient both in the way they are made and in the accuracy of their measurements. They are inaccurate because they use obsolete components, such as large tubes, resistors, and switches.

To satisfy modern technical requirements, the equipment should be well-made, small, and easily transportable and should not require industrial current for supply. It would be sufficient, for instance, to use semiconductors and ferrite and other miniature components in instruments, since such instruments could then be supplied by flashlight batteries.

Radio components should be standardized. The same intermediate frequency units, radio-frequency units, video channel units, and other units should be used in all sets.

Strict heed should be paid to aviators' suggestions, and their innovations should be used in the production of control and measuring equipment. -- Ye. Telengator, Engineer-Colonel (Moscow, Sovetskaya Aviatsiya, 20 Jan 59)

D. New Galvanic Dry Cells

New galvanic dry cells are much smaller than any previous types of power sources; they are the shape of buttons and vary in diameter from 11 to 30 mm. An 11-mm cell mounted in a Pobeda-type watch mechanism can keep the watch running for a year without winding. By increasing the cell's diameter to 30 mm, its output power is more than quintupled.

The so-called miniature nuclear battery, which is about the size of a matchbox, has a voltage of 400 volts. It can be used in apparatus requiring high-voltage and extremely low currents. It is the most durable of all miniature power sources.

The miniature silver battery, which is only as high as half the length of a matchstick, is capable of supplying 3-4 amp of current. Several such types of batteries have been designed with output currents from 3 to 1,000 amp. The entire series of silver batteries is one fifth the size of well-known lead-acid batteries.

The new cells and batteries have been developed in the Scientific Research Institute of Current Sources. Undoubtedly, they will be put into large-scale use in technology. -- D. Alekseyev (Moscow, Sovetskaya Aviatsiya, 11 Mar 59)

E. Schools for Radio Assemblers

Recently, technical and trade schools for training assemblers of radio equipment have been organized in many cities. These schools are improving the skills of their students, and are using the students for making improvements in the schools themselves.

For example, a radio engineering room with expositions of various capacitors and tubes was set up with the aid of students at the Omsk Trade School No 3.

Graphic educational aids have been made in schools of Leiningrad. These aids consist of enlarged diagrams of radio tubes and various radio receivers. (Moscow, Professional'no-Tekhnicheskoye Obrazovaniye, Mar 59, p 28)

F. Plants

The Cheboksary Electrical Performing Mechanisms Plant (Cheboksarskiy zavod elektricheskikh ispolnitel'nykh mekhanizmov) is supplying IM2/120 performing mechanisms (1). Specifications of the IM2/120 are as follows:

Rated moment on output shaft	2 kg/m
Power input	26 watts
Output shaft rotation time	120 sec
Voltage	220 volts
Weight	22 kg

The plant is located at Kanashskoye Shosse, Cheboksary. Its abbreviated name is EZIM. -- Advertisement (Moscow, Promyshlenno-Ekonomicheskaya Gazeta, 9 Jan 59)

[Comment: This appears to be a new plant.]

(1) Photo available in source, p 4, bottom

The Moscow Electrical Machine Building Plant [Stalinskiy Rayon] ships a great variety of products, ranging from electric record players to electric machines, to all parts of the USSR and to foreign countries. Products made by this plant are in operation at the Uhan Metallurgical Combine in China. (Moscow, Moskovskaya Pravda, 23 Jan 59)

[Comment: References to this plant in available sources have been comparatively infrequent.]

G. Defective Camera

A technologist from the Khar'kov Transport Machine Building Plant imeni Malyshev sent back from the Antarctic an urgent request for an FED-2 camera, which his wife purchased at the Khar'kov Central Department Store and sent to him. The technologist, Kovalevskiy, exposed many rolls of film on activities, conditions, and objects in Antarctica, on the ship, and in foreign ports during the trip home. However, when the film was developed, not a single exposure was printable. Every "picture" was only a series of round splotches. At the repair shop it was discovered that the lens of the camera had no internal elements; it was a factory reject. Of course, the camera was promptly replaced by the plant with one of excellent quality, but Kovalevskiy is still wondering how such an obvious reject could have passed quality control. (Moscow, Sovetskoye Foto, Jan 59, p 86)

H. Voltage Converter for Battery Radios

A small voltage converter for supplying the filament and plate circuits of Rodina-52, Iskra, Nov', Voronezh, and other battery radios from low-voltage batteries has been made available for purchase.

The power source for this converter may consist of five series-connected batteries of the 1.30-NVMTs-150 type, or any other 4.2-6-volt source (automotive storage batteries, flashlight batteries, etc.).

This instrument is mounted in a metal housing. It employs germanium transistors. The low-voltage current source is connected to the input of the converter and is turned on during operation of the radio by means of a tumbler switch. The output of the instrument provides voltage for feeding the filament and plate circuits. The efficiency of the converter is at least 50 percent, and input current is no greater than 300 milliamperes. The instrument measures 145 x 100 x 58 mm and weighs 520 grams. The price is 135 rubles. (Moscow, Novyye Tovary No 2, 1959, p 1)

[Comment: The use of a converter with a low-voltage battery is apparently one method of compensating for the shortage of high-voltage batteries in the USSR.]

I. Ozone Air Freshener

The new type OV-1 electrical ozone air freshener purifies air with the ozone it produces. This instrument is plugged into a 127- or 220-volt AC circuit, and has an input of 12 watts. It is produced by the Moscow Fizpribor Plant and will be put into use on a large scale.

The OV-1 measures 190 x 150 x 80 mm, weighs 2.5 kg, and sells for 164 rubles. (Moscow, Novyye Tovary, No 3, 1959, p 1)

Approved For Release 1999/08/25 : CIA-RDP78-03107A000100020010-8

II. LOCAL PRODUCTION AND ORGANIZATION

A. RSFSR

1. Moscow

The Scientific Research Institute of Scales and Instruments of the Moscow City Sovnarkhoz needs scientific workers and engineers for work in the fields of electronic measuring instruments, electrical automatics, and electrical measurements; radio engineers; instrument designers; class-7 radio assemblers; class-7 mechanics; and specialists in engineering calculations with experience in calculating elastic systems of power-measuring instruments.

Applications should be made to the Personnel Division of the institute at Kholodil'nyy Pereulok 1, Moscow. -- Advertisement (Moscow, Vechernyaya Moskva, 23 Jan 59)

2. Novosibirsk

The Novosibirskiy Sovnarkhoz has an Administration of Radio Engineering Industry.

The Technical and Economic Council of the sovnarkhoz and its sections work closely with scientific and technical societies, production workers, and trade union organizations. One of the conferences organized by the Radio Engineering Section was devoted to increasing labor productivity. This conference was attended by representatives of a number of enterprises and institutes in the Novosibirsk economic region and in other USSR cities. (Moscow, Sovetskiye Profsoyuzy, No 5, Mar 59, pp 20-21)

B. Armenian SSR

In 1957, by decision of the Council of Ministers USSR, a number of new scientific institutes and instrument making plants were organized in Armenia.

The Kirovakan Scientific Research Institute for the Automation of Production Processes in the Chemical Industry and Nonferrous Metallurgy, also called the chemical institute, is working on the over-all automation of a number of existing and planned chemical industry enterprises. Efficient systems for the automatic regulation of polymerization processes have been found; one of these has been put into use at the [Yerevan Synthetic Rubber] Plant imeni Kirov.

The Avtomatika Independent Design Bureau was also organized in Kirovakan. This bureau is developing a series of performing mechanisms. A plant specializing in the production of miniature potentiometers and bridges has also been organized in Kirovakan.

The Prompribor Independent Design Bureau has been organized in Leninakan. This bureau has already developed three new types of electronic moisture meters. The Yerevan Instrument Making Plant, which was organized in 1956, has already produced tens of thousands of galvanometers, current-ratio meters, and other instruments. An electrical metal-ceramic products plant is being organized.

In 1956, the Scientific Research Institute of Mathematical Machines was organized in Yerevan. This institute is engaged in the development and design of new high-speed electronic computers, both universal and specialized types. In one year, the institute organized an experimental base, where a computer has been built, adjusted, and put into operation. The institute has already developed and built the miniature Yerevan computer and the small Aragats computers, and has prepared them for operational setup. The Aragats can perform from 10,000 to 20,000 operations per second.

In 1959, this institute will complete the development of the new high-speed Razdan computer. This all-transistor machine performs several thousand mathematical operations per second. The institute is also developing a machine for processing the results of the All-Union Census, a machine for the automatic control of electrolysis processes in aluminum vats, and a machine for controlling power processes in the Sevan-Razdan cascade of electric power stations.

The institute has just begun the development of superhigh-speed vacuum tube computers and semiconductor computers. The desire to raise the operational speed of machines is a matter of keeping up with the constantly growing demands of modern technology and science. -- S. Mergelyan, Director, Scientific Research Institute of Mathematical Machines (Yerevan, Kommunist, 13 Jan 59)

The Yerevan Elektrotochpribor Plant has mastered the production of high-precision medium-size microammeters and milliammeters; millivoltmeters; high-voltage indicators; current finders; and low-voltage snap-around amprobes. It also produces these instruments for operation in hot and humid climates. Plant designers have developed new types of microammeters with magnets inside the frames in both rod-mounted and flush-mounted versions, and new high-voltage snap-around amprobes.

The new Yerevan Instrument Making Plant has begun series production of thermal measuring instruments. The Kirovakan Avtomatika Plant has produced its first miniature electronic induction instruments for the control

and regulation of thermal power processes. Leninakan instrument makers have begun the production of viscosimeters. During the Seven-Year Plan, performing mechanisms plants and other instrument making enterprises will be organized in Armenia.

The Leninakan Prompribor Independent Design Bureau has developed a portable moisture meter for determining the moisture content of grain. A regulator of fabric moisture content has been developed by order of the Leninakan Textile Combine. An experimental model of this regulator is undergoing testing at one of the mills of the combine.

The Kirovakan Avtomatika Independent Design Bureau has developed a number of MZK electrical performing mechanisms designed for moving regulating components of automatic and remote control systems. They will be widely used at enterprises of the metallurgical, chemical, petroleum, power engineering, and other branches of industry. Experimental models of performing mechanism, along with manufacturing documents, have been submitted for series production. Air-conditioning equipment needed by synthetic fiber plants has also been submitted for industrial production. (Moscow, Promyshlenno-Ekonomicheskaya Gazeta, 14 Jan 59)

C. Georgian SSR

The Staliniri Elektrovibromashina and Emal'provod plants are the first electrical industry enterprises in the Yugo-Osetinskaya Autonomous Oblast. The Elektrovibromashina Plant produced its first few new products at the end of 1958. In 1959, it will be producing vibrating machines, small boilers, carts, and other products; its output will be double that of 1958.

The Emal'provod Plant is striving to get out its first products. Its personnel have been sent for training to leading [cable?] plants in the USSR. (Tbilisi, Zarya Vostoka, 7 Jan 59)

In 1959, electrical and instrument plants founded during 1958 in Tbilisi, Kutaisi, Batumi, Sukhumi, Staliniri, Gori, Poti, Zestafoni, and other cities will begin the production of many new machines and materials, such as automatic electric welding equipment, tower crane electric motors, micropower electric motors, electric carts, turbopumps, electric drilling rigs, and electric washing machines. -- G. D. Dzhavakhishvili, Chairman, Council of Ministers Georgian SSR (Tbilisi, Zarya Vostoka, 10 Jan 59)

D. Azerbaydzhan SSR

The Seven-Year Plan forecasts a tripling of the gross output of the machine building industry of the Azerbaydzhan Sovnarkhoz. This includes an increase in the production of instruments to 7.6 times and of electrical equipment to 6.1 times the current level.

The construction of the Baku Electrical Machinery Plant will be completed so as to have it operating at planned capacity. A cable plant will begin production in 1959; an illumination engineering equipment plant will begin production in 1960; an electrical installation products plant will begin operations in 1961; an electrical insulation materials plant will start production in 1963. -- I. D. Mustafayev, First Secretary, Central Committee, Communist Party of Azerbaydzhan (Baku, Bakinskiy Rabochiy, 9 Jan 59)

E. Lithuanian SSR

In 1959, the output of the instrument making industry of the Lithuanian SSR will rise 23 percent over the 1958 level. This figure includes a 35-percent increase in the production of electric motors, an increase of around 300 percent in the production of radio receivers, and a 150-percent rise in the production of computing machines. The Panevezhis Cable Products Plant (Panevezhskiy zavod kabel'nykh izdeliy), the Vil'nyus Television Unit Plant (Vil'nyusskiy zavod televizionnykh uzlov), and the Kedaynyay Low-Voltage Equipment Plant (Kedaynskiy zavod nizkovol'tnoy apparatury) will deliver their first products. -- K. Kayris, Chairman, Lithuanian Sovnarkhoz (Vil'nyus, Sovetskaya Litva, 10 Jan 59)

In 1959, the Panevezhis Cable Plant (Panevezhskiy kabel'nyy zavod), the Vil'nyus Television Unit Plant (Vilnyusskiy zavod televizionnykh uzlov), and the Kedaynyay Low-Voltage Electrical Equipment Plant (Kedaynskiy zavod nizkovol'tnoy elektroapparatury) will go into operation. (Vil'nyus, Sovetskaya Litva, 20 Jan 59)

During 1959-1965, enterprises of the Lithuanian Sovnarkhoz will begin the production of new small electric meters, new two-speed tape recorders, and transistorized tape recorder attachments. Instrument plants will produce equipment developed by the Scientific Research Institute of Electric Engraving, including units for the production of photosemiconductive paper, blueprint reproduction units, and magnetic engraving machines (magnitografskiye mashiny). -- M. Zenkevich, Deputy Chief, Technical Division, Lithuanian Sovnarkhoz; Yu. Rusenko, Senior Engineer for Automation and Mechanization, Lithuanian Sovnarkhoz (Vil'nyus, Sovetskaya Litva, 10 Jan 59)

F. Kazakh SSR

During the Seven-Year Plan, the production of X-ray equipment, oxygen respiration equipment, and instruments for gas analysis will be organized in Kazakhstan. (Alma-Ata, Kazakhstanskaya Pravda, 15 Jan 59)

III. ELECTRONIC EQUIPMENT

A. General

The USSR now occupies one of the leading places in world radioelectronics. There is no complex radioelectronic equipment in the world that the Soviet radio industry could not develop and produce.

Now, even the most inveterate critics of the socialist system must admit that Soviet science and technology in many fields has surpassed that of technologically advanced countries such as the US. Soviet specialists were the first to develop electronic equipment which could be used for launching the first earth satellites and for sending the Soviet cosmic rocket into space.

In 1958, the USSR radio industry produced tens of millions of semiconductors, hundred of millions of vacuum tubes, and about one billion radio components of various types.

During the Seven-Year Plan, there will be a conversion in industry to over-all automation and mechanization by electronic means. This will require accelerated development of the scientific research and production bases of the radioelectronic industry.

With the wider use of radioelectronic equipment, and with an impending increase in the areas of its application, more specialists will be required. However, this does not mean that the development of radioelectronic equipment can take place only centrally, in special radio engineering organizations. All scientific research and design organizations of various branches of the national economy where the possibilities and need for radioelectronic methods have been shown should be drawn into this work. For this purpose, specialists of these branches of technology should study radioelectronics and find applications for it in cooperation with radio specialists.

Thus, the primary tasks of radio engineering organizations are to be development and production of radio components for building radioelectronic systems.

Until recently, the components produced have been limited to such products as vacuum tubes, semiconductors, resistors, capacitors, ferrite cores, and a small number of such simple parts as tube panels, switch wafers, ceramic products, and basic units of television and radio receivers. Now it is time to effect a radical expansion in the variety of radio components developed centrally.

These components should include fully assembled tube stages, audio and intermediate-frequency amplifiers, analog computer registers (yacheyka), delay lines, converter circuits, matching devices, and many other units of complex radioelectronic systems which can be standardized. These components will be like bricks, which will be used for building complex equipment. Such a system will cut down the work of designers considerably, and will accelerate the development of new equipment and simplify putting this equipment into production. The large-scale usage of standardized units will make it possible to utilize modern high-production methods, including full automation of industrial processes in producing them centrally, this in turn will lower the cost of such units and the cost of radioelectronic apparatus made out of them.

A second no less important problem is that of increasing the reliability of radioelectronic equipment. This is one of the most important tasks of designers and radio industry workers during the Seven-Year Plan.

Soviet engineers and scientists have done much work in the development of semiconductors. Those transistors which have been put into production and those which have been developed by USSR scientific research organizations can be used in various radioelectronic equipment. The sovnarkhozes should increase the production of semiconductors in all possible ways, and should improve industrial processes in such a way that the cost of semiconductors would not exceed that of vacuum tubes and that in the future the cost would be below that of vacuum tubes.

In 1965, 4.6 times as many television sets and 1.7 times as many radio receivers will be produced as in 1958. For this purpose, radio industry workers must solve a number of important problems, one of which is lowering the production costs of mass-types of receivers, especially television sets, so that they could be available to all strata of the population.

A sharp cut in the cost of television sets can occur only when modern high-production methods of production are introduced, such as the automation of component production and assembly operations. For this reason, the designs of all newly developed television sets should satisfy the requirements of automated production.

Much work has to be done by designers in improving video, since so far television sets and television transmitting equipment do not utilize all of the qualitative indexes embodied in the Soviet standard for television signals.

At present, the radio industry is finishing the development and production of color transmission equipment for the Moscow Television Center. Experimental color television transmissions will begin in 1959. By the end of the Seven-Year Plan, color transmissions will begin in a number of the largest cities of the USSR. However, scientific research and experimental design work in the field of color television will continue through 1959-1965, since the main task, the creation of a low-cost color television set no more expensive than a black-and-white set, has not been solved. Only if a cheap design can be found can color television be put into large-scale use in the USSR.

New postwar models of USSR radio receivers and radio-phonographs have been improved by lowering frequency and nonlinear distortion. Improvements have been made lately in connection with the introduction of stereophonic systems. Scientific research institutes are working on the problems of utilizing stereo sound in tapes and records and in radiobroadcasting.

During the Seven-Year Plan, television and radio transmission equipment must be modernized to a great extent. Besides improving the quality of radio and television channels, it is necessary to provide for a maximum reduction in operating costs. This can be achieved by using automatic remote-control systems, which would make large operating staffs unnecessary. Ultrashort-wave stations, wired-radio units, intermediate stations of radio relay lines, and other equipment should be made so as not to require operating personnel. Work under way at present should be completed so that the new automatic equipment can be put into operation during the early years of the Seven-Year Plan.

Practically all the computing apparatus used for space research is based on electronic principles. Our designers will develop new improved equipment for space ships. -- V. Kalmykov, Chairman, State Committee for Radioelectronics, Council of Ministers USSR (Moscow, Radio, Mar 59, pp 6-7)

Scientists of the Electrical Engineering Institute of Communications imeni M. A. Bonch-Bruyevich are solving many important problems in the realm of telecommunications and radioelectronics.

Docent F. V. Kushnir, Deputy Chief for Scientific Work of the institute, states that his laboratories are doing work in the development of components for color television, computers, electronic automatics, long-distance ultrashort-wave radio relay lines, and other items.

The Television Laboratory headed by Prof P. V. Shmakov has developed equipment for transmitting color pictures from studios and for showing color motion pictures.

The currently operating radio relay line between Leningrad and Tallin makes it possible to have multichannel telephony, telegraphy, radiobroadcasting, and television broadcasting. The relay stations on this line are located on an average of 50 km apart.

The Chair of Radio Transmitting and Receiving Installations and the Chair of Antennas and Radio Wave Propagation are doing extensive work in the development of transmitters and receivers which would make it possible to cut the number of relay stations to one fifth to one sixth the present number. Regular communications between two relay stations located about 300 km from each other have been achieved on one of the frequencies of the band under study. During the night of 6-7 January 1959, success was achieved in receiving ultrashort-wave signals from a distance of about 2,000 km.

Great contributions to this work are being made by communists such as Prof G. A. Zeytlenok (2); Prof M. P. Dolukhanov; Docent I. I. Fomichev (3), a member of the institute's party bureau; Docent Ye. V. Ryzhkov; Leading Engineer G. V. Benben; and Senior Mechanical Technician L. D. Khol'nyy. (Leningradskaya Pravda, 9 Jan 59)

(2) Photo available in source, p 2, top, right, middle figure

(3) Photo available in source, p 2, top, right, left figure

B. Radio

The USSR radio engineering industry has developed a new FM ultrashort-wave radio station, which is designed for operation without steady operating personnel and can be controlled from a distance of about 10 km. The new equipment is superior to analogous equipment now in series production and in operation in the USSR, since it is smaller in size, has higher acoustic qualities and efficiency, and has better operational qualities.

(Source gives complete description of this new equipment.) (Moscow, Vestnik Svyazi, Mar 59, pp 9-10)

The ZhR-1 train radio was developed in 1948. It is designed for operating on one of ten possible frequencies in the 114-143.5-meter band. At present, several thousand ZhR-1 radios are in use for yard operations.

In 1954, the new ZhR-3 train radio was developed. It is less prone to interference than the ZhR-1 and operates on the same wave band. The next step to be taken is to replace these radios with new ultrashort-wave types.

The type ZhR-4P portable radios have been developed for yard communications purposes. These operate in the ultrashort-wave band and can communicate with a stationary installation up to distances of 1-2 km. They are fed by a storage battery capable of supplying them continuously for 4-5 hours. (Moscow, Avtomatika, Telemekhanika, i Svyaz', Mar 59, pp 23-24)

Industrial production of the type ZhR-5 single-channel ultrashort-wave radio for railroad radio communications is beginning in 1959. The ZhR-5 has a longer service radius than the ZhR-3. Its mass production is contemplated for 1960.

The radio engineering industry, in collaboration with radio specialists of Giprotranssignalsvyaz' [State Institute for Signaling and Communications Planning for Transport], has developed the ZhR-4P portable radio and the ZhR-4S stationary radio, both operating on fixed frequencies in the 42-46-mc band. (Moscow, Vestnik Vsesoyuznogo Nauchno-Issledovatel'skogo Instituta Zheleznodorozhnogo Transporta, No 2, Mar 59, pp 17-18)

The Scientific Research Institute of Radiobroadcast Reception and Acoustics, in Leningrad, has developed several miniature transistor radios, including the Sputnik and the Progress, which it will exhibit at the 1959 Soviet exposition in New York. In addition, it will exhibit new Soviet stereophonic radio-phonographs. Institute workers are equipping a small stereophonic sound studio at the exposition. (Leningradskaya Pravda, 14 Jan 59)

Besides the small Sputnik radio, the Institute of Radiobroadcast Reception and Acoustics has developed the Syurpriz transistor radio. (Riga, Sovetskaya Latviya, 21 Jan 59)

The Sputnik transistor radio developed by the Institute of Radiobroadcast Reception and Acoustics weighs only 950 grams. It is supplied by a miniature storage battery. The Syurpriz transistor radio also developed by the institute is a little larger and heavier than the Sputnik and is supplied from two flashlight batteries. Both radios receive long- and medium-wave broadcasts. (Leningrad, Vecherniy Leningrad, 10 Jan 59)

The radio industry of the Saratov industrial and economic region had developed the Syurpriz pocket radio (4; 5) and has prepared it for series production.

The Syurpriz is the most compact of superheterodyne transistor receivers which have been developed recently by the radio industry and are now in production.

The utilization of printed circuits will cut the costs of this radio considerably when it is mass-produced.

(Source gives full description of the Syurpriz.) (Moscow, Radio, Mar 59, p 40)

(4) Photo available in source, back cover

(5) Photo available in source, facing p 32

[Comment: The existence of a radio industry in the Saratov region has not been noted previously in available sources.]

The Voronezh portable radio went into production in 1958. This set measures 175 x 120 x 45 mm; weighs 850 grams; and has a type 0.25 GD-1 miniature dynamic loud-speaker with a 250-mw output, a flashlight battery power source, and a magnetic antenna, all contained within its housing. It picks up stations in the medium-wave band (620-1,600 kc).

The Voronezh is a superheterodyne six-stage receiver based on nine transistors, types P14 and P13A, and printed circuits. It has an undistorted output of 90 mw and an input of .36 mw, and can operate continuously for 25 hours on a single battery. The set sells for 600 rubles. (Moscow, Novyye Tovary, No 3, 1959, p 2)

The Murom [Radio] Plant has assembled experimental models of the modernized Muromets radio receivers. These receivers can be turned on and off automatically according to a preset schedule. (Moscow, Izvestiya, 14 Jan 59)

The popular Rodina radio receiver has been modernized and renamed the Rodina-59. It is now more economical to operate because of the type P-29 tube and the modern P-13A transistors used in it. It has a long-wave band, a medium-wave band, and three short-wave spread bands, which are switched with keyboard controls.

The true sensitivity of the set on any wave band is at least 200 microvolts. It has an improved audio stage and utilizes dual tone controls. It reproduces frequencies ranging from 100 to 4,000 cycles for radiobroadcasting and from 100 to 7,000 cycles for record playing. The 1GD-6 loudspeaker has an output power of .15 watts and develops a sound pressure of 3 bars.

The Rodina-59 will be sold in an electric version and in a battery version which will utilize two batteries: an "Ekran" and a "Zarnitsa." The "Zarnitsa" battery is necessary for the normal operation of transistors; its voltage is stepped up with the use of a converter, which supplies power to the tubes. The converter is installed inside the cabinet and utilizes crystal diodes and transistors.

The electric version has a rectifier utilizing five diodes. It can be supplied from a 127- or a 220-volt AC circuit. The set measures 480 x 310 x 255 mm and weighs 11 kg. (Moscow, Novyye Tovary, No 3, 1959, p 3)

The design bureau of the Riga VEF Plant has developed the model of a new Class-1 radio-phonograph, which has been named the Latviya. This new set utilizes miniature tubes, a high-sensitivity internal magnetic antenna, and several loud-speakers.

The ultrashort-wave band has a tuning control separate from that used by the other bands. (Moscow, Sovetskaya Torgovlya, 20 Jan 59)

Series production of the Oktava-58 radio-phonograph has begun. This five-band set has an internal rotating magnetic antenna for long and medium waves and a built-in ultrashort-wave antenna. It features keyboard band switches, a tuning eye, automatic volume control, and dual tone controls. Its acoustic system consists of four loud-speakers. (Kiev, Rabochaya Gazeta, 15 Jan 59)

C. Television

The Scientific Research Institute of the Ministry of Communications USSR has developed new television radio-relay apparatus, which is designed for the long-distance transmission of television programs and for multichannel telephony. The first line of this type is being constructed between Moscow and Khar'kov. When it is set up, Khar'kov residents will be able to watch television programs originating in Moscow and vice versa. (Kiev, Rabochaya Gazeta, 23 Jan 59)

The All-Union Scientific Research Institute of Television has developed the RTU reporter television unit, designed for extrastudio broadcasts. The RTU consists of two parts, the PPU portable transmitting unit and the SPU stationary receiving unit.

The camera of the PPU is of highly compact design and is the same in size and appearance as a hand-operated narrow-film movie camera. It employs a vidicon tube and has optical and electronic video selectors. With a lighting of 500 luxes on the photographed object, it can provide a picture with a sufficient signal noise ratio. The image definition is 500 lines.

The PPU set has two knapsacks: one has the video signal forming unit with an independent power supply and the other an audio unit with a power supply. The camera and video signal forming unit are carried and run by an operator, while the audio unit is carried and used by a commentator.

The SPU has two receiving units. The upper unit with its antenna array is mounted on the roof of the nearest high building while the telecast is in progress. The lower unit is installed in a bus-mounted PTS mobile television station. Both receiver units are connected to the mobile station with a flexible cable.

The transmission of video signals from the PPU to the SPU takes place with the use of a radio line operating on the decimetric wave ban. The audio signals from the PPU to the SPU are transmitted over another radio line on the metric wave band. The transmitters are located in the knapsacks.

Instructions from the director of the PTS are transmitted to the PPU by a radio communications line. The transmitter of this line is located in the upper unit of the SPU; the receiver is in the PPU operator's knapsack. This radio line has an operating radius of 800 meters. Semiconductors are used extensively in the RTU; consequently it is small, light, and requires little power input. It is supplied from storage batteries in the knapsack.

The operator and commentator can move about completely freely with the RTU. This unit can be used in places inaccessible to conventional television cameras. (Moscow, Tekhnika Kino i Televideniya, Feb 59, p 45)

The Scientific Research Institute of the Ministry of Communications has developed color-television transmission equipment (6) and the models of two color television receivers with 1,200- x 900-mm and 480- x 360-mm screens. The institute has equipped an experimental color television studio for making test color broadcasts.

The 12.5 million television sets to be produced during the Seven-Year Plan will include a considerable number of color sets. Moscow residents will see the first test color broadcasts at the end of 1959. (Leningradskaya Pravda, 11 Jan 59)

(6) Photo available in source, p 1, bottom, right

The L'vov Television Plant has pledged to develop and build two new television sets, the L'viv-10 and the Trembita, before the 21st Congress of the CPSU. The L'viv-10 is a high-fidelity, slim-line, large-screen set. The Trembita is a small set. Both use picture tubes made by the L'vov Electric Bulb Plant.

The L'vov Television Plant is now finishing the models of the new sets. (Kiev, Pravda Ukrainy, 9 Jan 59)

Conveyer production of the new Voronezh television sets has begun at the Voronezh Elektrosignal Plant (7). (Moscow, Ogonek, No 16, Apr 59, p 4)

(7) Photo showing the assembly of the new television sets available in source, p 4, top, right

The new, small Zarya television set is a rival to the well-known, reliable KVN-49 set. Its screen measures 280 x 210 mm, which is four times the size of the KVN-49, and it can receive five channels. (Moscow, Izvestiya, 17 Jan 59)

A Leningrad plant is already producing the Zarya television set, which weighs only 15 kg. Its main controls are located on the right side panel. It has an operating range of 40-50 km, and can receive telecasts with either outdoor or indoor antennas. It has an input of only 110 watts and costs the least of any currently produced USSR television set. (Moscow, Leninskoye Znamya, 18 Jan 59)

The Almaz-102 and Almaz-103 television receivers make full use of the circuit and chassis of the Rubin-102 television receiver, but the Almaz sets have been substantially improved through use of the large 53LK2B picture tube and a four-speaker accoustical system.

One 4GD-1 speaker is mounted on each side of the cabinet, and two 1GD-9 speakers are mounted in the front panel. The two Almaz sets are distinguished by differences in the cabinets and in the location of controls.

Both sets measure 440 x 555 x 490 mm and are priced at 3,400 rubles. (Moscow, Novyye Tovary, No 2, 1959, p 2)

Industrial production has started of the 12-channel ATK-1 television antenna designed for reception on any of the 12 channels received in the USSR, ranging from 48 to 100 mc and from 74 to 230 mc. It consists of a telescopic vibrator-type antenna which can be extended from 610 to 1,630 mm in length. The tentative price of this antenna is 80 rubles. (Moscow, Novyye Tovary, No 2, 1959, p 2)

D. Telephones

The special design bureau of the Dnepropetrovsk Selenium Rectifier Plant has developed the TAK-3 sparkproof telephone for coal combine operators. Communications are effected by a two-wire system. The operating conductor of the control circuit of a six-core GRShS cable is used as the sending wire, and the ground wire is used as a return. The signals are reproduced with the use of a DEM-4M capsule and a horn. The electrical circuit of the telephone uses germanium transistors.

Recently, plant designers developed the PRVS-2 instrument, which will be used for calculating ventilation networks by electrical analogy. (Moscow, Promyshlenno-Ekonomicheskaya Gazeta, 9 Jan 59)

The telephone shop of the Riga VEF Plant has begun the production of the Viktoriya telephone handsets. (Riga, Sovetskaya Latviya, 23 Jan 59)

E. Components

The picture tube assembly shop (8) of the L'vov Electric Bulb Plant has converted to a 7-hour workday. By the end of the Seven-Year Plan, this plant will become one of the largest of its kind in Europe. (Moscow, Ogonek, No 14, Mar 59, p 7)

(8) Photo available in source, p 7, left, middle

A selenium rectifier has been designed for charging six-volt storage batteries for such things as motorcycles, motorollers, and "motor carriages" (motokolyaska) [small vehicles for disabled person?], and two-volt battery lamps, from AC current of 127 or 220 volts. Switching from one voltage to another is done by means of changing the plug from one socket to another.

This rectifier is designed on a two-half-cycle circuit with a center point. The charging circuit includes a signal lamp which indicates the amount of charge current. The unit is mounted in a metal case with a cover which houses lead wires and clamps for fastening onto battery terminals.

Light, compact, and portable, this rectifier measures 125 x 96 x 64 mm and weighs 1.45 kg. It costs 35 rubles. (Moscow, Novyye Tovary, No 2, 1959, p 5)

V. A. Fitisov, until recently the director of the Voronezh Radio Components Plant, has been appointed chairman of the Voronezhskaya Oblast Council of Trade Unions. (Moscow, Sovetskiye Profsoyuzy, No 5, Mar 59, p 12)

F. Prices

The following items were listed in a prize list for the Second Lottery of the Moldavian SSR:

	Price (rubles)
Dorozhnyy radio receiver	350
Turist radio receiver	330
KVN-49 television set with lens	970

(Kishinev, enclosure to Sovetskaya Moldaviya, 4 Jan 59)

The Rostov-na-Donu Base of the All-Union Mail Order Office, Ministry of Trade RSFSR, has the following articles for sale:

	Price (rubles)
Ural-57 radio-phonograph	1,039
Rekord radio receiver	339
Strela radio receiver	262
Rodina-52 battery radio with battery and antenna	583.90
Iskra battery radio with battery and antenna	345.90
Voronezh battery radio with battery and antenna	380.90
Five-ampere 220-volt electric meters	180

The above prices include mailing and handling charges, which were substantially reduced as of 1 January 1958. -- Advertisement (Yerevan, Kommunist, 10 Jan 59)

IV. COMPUTERS

At present, more than 20 types of high-speed analog computers have been developed in the USSR. Series production of such machines has begun.

According to V. B. Ushakov, Chief Designer for Electrical Analogy of the Scientific Research Institute of Computer Machine Building, 1958 was a year of progress in the manufacture of computers. USSR plants series-produced several types of analog computers, which proved to be the best for various research and planning work.

The MN-M analog computer, which utilizes some transistorized units, has been put into production. Production has started of the very interesting VPRR-2, which can help a plant production engineer pick out the optimum metal cutting conditions for machine tools. In 1958, certain specialized machines for various branches of the national economy were produced for the first time.

Trips abroad by Soviet specialists have shown that USSR computers are as good as or better than foreign-made models. This is true especially of such a machine as the MN-10, which will be put into series production in 1959. This machine is the first transistorized analog computer and weighs 50 kg. It will be demonstrated at exhibitions at home and abroad.

During the first year of the Seven-Year Plan, the production of the MN-11 machine will begin. This computer alone will automatically find the optimum solutions for equation systems fed into it. It will give up to 100 full solutions per second, as compared with a machine in the US which now has achieved only 60 full solutions per second. (Moscow, Moskovskaya Pravda, 10 Jan 59)

The development of the production of computing machines is not included in the 7-year plan for the Leningradskiy Sovnarkhoz. The sovnarkhoz has limited itself to organizing one computing center with a small design bureau at the Leningrad Division of the Mathematical Institute of the Academy of Sciences USSR.

In 1958, the sovnarkhoz enthusiastically began the production of electronic machines. Its leaders were recruiting specialists and were exploring the possibilities of including this type of production in the plan for Leningrad industry. It was too late to do this in 1958, but all interested organizations expected that such a production base would be organized in Leningrad in 1959. However, the matter came to a standstill, and was deleted from the plans.

In 1957, a group of scientific workers organized the Leningrad Coordinating Scientific and Technical Council for Computer Technology. The coordinating council explained that a large number of institutes and enterprises were working independently on problems of computer technology. Some vuzes (higher educational institutions) were making their own computers of various types. Many scientific institutes have specialist groups working on the development of such machines. The council asked about having a computing machine plant organized in Leningrad. The plant, with the help of Leningrad scientists and engineers, could organize in a very short time the series production of computers such as the M-3.

The Leningradskiy Sovnarkhoz must review the problem of using the industry and the scientific manpower of the Leningrad economic region for the development of computer technology. We believe that a way can be found to organize a plant and a design bureau in Leningrad for the production of electronic computers, or to organize at first a special shop at a plant producing similar equipment. The Leningrad City Executive Committee could provide the necessary production facilities.

It is time someone considered organizing a special scientific research institute for computer technology in Leningrad and combining it with the electronic computing machine plant. -- Prof S. Izenbek, Head of Chair of Analog Computer Instruments and Installations, Leningrad Institute of Precision Mechanics and Optics (Moscow, Izvestiya, 14 Jan 59)

On 3 January 1959, a control computer developed by the Tbilisi Scientific Research Institute of Instrument Making and Automation Equipment was sent to the Zestafoni Ferroalloys Plant for industrial testing.

By solving complex mathematical equations, this machine will automatically maintain a predetermined power feed schedule for an electric arc furnace.

The machine sent to Zestafoni is one of many complex mathematical control machines being developed by the institute. Some of these machines are designed for the over-all automation of blast furnace operations. They are being developed by workers of the Tbilisi institute, in collaboration with the Central Scientific Research Institute of Ferrous Metallurgy. The institutes have already developed a control computer for predicting the incipient points of gas channeling at the top of blast furnaces and for controlling the proper charge distribution in these furnaces.

The Tbilisi institute is now developing a machine for automating foundry processes and a machine for making certain dispatcher computations in power systems. Such computations, which once took many hours and even days to carry out, are done by the machine in several minutes.

In 1959, a machine for automatically calculating charges and maintaining the heating program of foundry cupola furnaces will be introduced in industry. Such machines form the basis of the institute's project for the over-all automation of foundry furnace operations, including apportioning and loading of charges.

The institute is developing other original machines, including control computers for automating certain stages of the cracking process at oil refineries and computers for automating stabilization equipment of tea factories.

About 100 control computers for automating production processes will be created in the Tbilisi institute during the Seven-Year Plan. -- B. Bukiya, Director, Tbilisi Scientific Research Institute of Instrument Making and Automation Equipment (Tbilisi, Zarya Vostoka, 7 Jan 59)

The Tbilisi Scientific Research Institute of Instrument Making and Automation Equipment is supposed to develop mathematical computers and computers for the control of production processes. More than 100 of these machines are to be developed and put into operation in the proper branches of industry during the Seven-Year Plan.

During its 2 years of operation, the institute has not only carried out research on the possibilities of using mathematical machines in the metallurgical, power engineering, machine building, chemical, and petroleum refining industries, but has also developed and built a number of machines based on this research. Some of these will be put into operation in industry during 1959.

Soon, tests will be made at the Zestafoni Ferroalloys Plant of a control computer for maintaining a steady operating schedule for an arc furnace.

The institute is studying and working out a project for the over-all automation of blast furnaces. Experimental models of machines for this purpose have already been produced. Two of them will be put into operation in 1959 at the Transcaucasus Metallurgical Plant.

The Tbilisi institute, jointly with the Chair of Automation of the Georgian Polytechnic Institute imeni S. M. Kirov and the personnel of Gruzenergo [Georgian SSR Electric Power Administration], is studying and working out the problem of using computers for the over-all automation of the control of electric power systems. The institute has already developed and produced a mathematical machine for making certain dispatcher calculations for electric power systems.

Mathematical machines for computing the charges and heating schedules of cupola furnaces have been developed and will be introduced into production in 1959. In the future, a machine for controlling the operations of cupola furnaces will be developed.

The institute at the same time has begun the development of control computers for the tea and petroleum-refining industries, based on exploratory research already successfully carried out.

In compiling technical assignments and in working out the industrial principles for developing new automation equipment, the institute maintains close contact with the industries which will use its machines in the future, as well as with specialized scientific research institutes engaged in the manufacturing process development of those branches of industry for which the mathematical machines are intended. -- B. S. Bukiya, Director, Tbilisi Scientific Research Institute of Instrument Making and Automation Equipment (Tbilisi, Zarya Vostoka, 14 Jan 59)

The MN-10 all-transistor analog computer was developed by NIISChetmash [Scientific Research Institute of Computer Machine Building], which produced the first model, utilizing 653 semiconductor diodes and transistors, in December 1957.

(Source gives additional information on the MN-10). (Moscow, Priborostroyeniye, Jan 59, p 10)

A new universal computing machine (9), designed for determining the optimum productivity of metal-cutting machine tools, has been manufactured in Riga. This machine permits the simultaneous solution in 35 seconds of the five problems which define the operating conditions of the machine tools. It computes data under conditions of high-speed and forced-feed machining, and also computes machining time when the machine tool is operating at full capacity. These data are of considerable significance to machine building plants.

This new machine, which is no larger than an ordinary cash register, was designed by Prof S. Mozhayev of Leningrad and Senior Engineer A. Meyershteyn of the Riga Etalon Plant, who have successfully completed testing an experimental model and have prepared the machine for series production. Considerable assistance has been rendered in this undertaking by designers of the Riga Radio Plant imeni Popov.

One of these machines has been sent to the exhibit of new technology in Moscow. -- I. Zabobonin, Chief, Technical Division, Administration of the Radio and Electrical Engineering and the Metal Working Industry, Latvian Sovnarkhoz (Riga, Sovetskaya Latviya, 22 Jan 59)

(9) Photo available in source, p 4, right center

V. INSTRUMENTS

A. General

The 1965 output of instruments and automation equipment in the USSR will be 150 percent above the 1958 level. The output of computers and mathematical machines will be 370 percent above the 1958 level.

The output of standardized (unifitsirovannyy) automation equipment will rise significantly. In addition to the widely used AUS (Standard Unit System), an EAUS (Electronic Standard Unit System) using direct current is now being developed. The development of a USAKR (Standard Electronic System of Control and Regulation) using alternating current is being completed. The products-list of hydraulic regulation equipment is being expanded. It is contemplated that connections will be made between all of the above-named systems by using electropneumatic, pneumoelectric, pneumohydraulic, hydropneumatic, electrohydraulic, and hydraulic-electric converters.

Preparations are being made for employing mathematical machines on a large scale. The number of organizations developing automation equipment will be tripled.

A Scientific and Technical Council for Over-all Mechanization and Automation of Production Processes has been organized under Gosplan USSR. This council has branch sections, which are assigned to determine the basic technical trends and the technical and economic level of automation in individual branches of the USSR national economy. (Moscow, Priborostroyeniye, Jan 59, pp 1-2)

According to the preliminary figures for the Seven-Year Plan, from 1,488,000,000,000 to 1,513,000,000,000, rubles will be allotted for industrial construction. Expenditures for instruments and automation equipment will amount to 5-10 percent of the total expenditures for constructing modern industrial enterprises. Therefore, 75-100 billion rubles' worth of instruments and automation equipment will be needed for the new construction.

However, this figure does not include the reconstruction, re-equipping, and expansion of existing enterprises. Thus, an average of 12-16 billion rubles' worth of instruments and automation equipment must be produced during each year of the Seven-Year Plan if industrial needs are to be met. Since only a portion of the instruments and automation equipment are used by industry and a large share is used for serving the populace and for scientific research purposes, the volume of instrument making should be raised to 24-25 billion rubles in 1965. Thus the volume would be at least 3.2-3.4 times instead of 2.5-2.6 times the present volume.

The gosplans and the scientific and technical committees of the USSR and the union republics should give serious thought to this weighty problem. -- K. B. Arutyunov, Director, NIITeplopribor [Scientific Research Institute of Thermal Power Engineering Instrument Making] (Moscow, Priborostroyeniye, Jan 59, pp 4-5)

The following measures and measuring instruments have been approved by the Committee for Standards, Measures, and Measuring Instruments on the basis of state testing, and are permitted for use in the USSR:

GMB metric wave oscillator, Kiyevskiy Sovnarkhoz

Avangard calibration frequency measuring unit, Moscow Oblast Sovnarkhoz

VLI-2 pulse-type vacuum tube voltmeter, Gor'kovskiy Sovnarkhoz

U302 DC potentiometric unit, Krasnodarskiy Sovnarkhoz

TsEP-3 photoelectronic chromatic pyrometer, Kaluzhskiy Sovnarkhoz

Kaktus unit for measuring gamma-radiation doses, Belorussian Sovnarkhoz

M 224 moving-coil panel ammeter, to be united with previously approved moving-coil microammeters, with the plant designation of M 494, Omskiy Sovnarkhoz

RT-10 radar tester for frequencies of 2,700-3,100 mc, Leningradskiy Sovnarkhoz

RT-10A radar tester for frequencies of 3,060-3,390 mc, Leningradskiy Sovnarkhoz

DP-11-B, beta-gamma radiation meter, Moscow City Sovnarkhoz
(Moscow, Izmeritel'naya Tekhnika, Mar 59, p 63)

[Comment: In most lists of this type, the names of the producing plants are given. The fact that they are not given here may indicate reluctance to divulge such information in the case of key items.]

B. Industrial Controls

The Experimental Design Bureau for Automatics of the State Committee for Chemistry of the Council of Ministers USSR is developing and producing special instruments for automating chemical enterprises. Recently it developed the FKZh-1 fluid photocalorimeter, which is used for determining the divalent copper content in the production of synthetic ammonia, and the FKG gas photocalorimeter for checking the concentration of hydrogen sulfide in gas mixtures. (Moscow, Promyshlenno-Ekonomicheskaya Gazeta, 23 Jan 59)

An instrument designed in the Institute of Nuclear Physics of the Academy of Sciences Uzbek SSR has been installed on the Sormovskiy-7 suction dredge, which is operating in one of the main-line canals in Kara-Kalpakskaya ASSR. This instrument is used to determine the density of the mud being removed by the dredge from the bed of the channel. A small device, a source of gamma rays of radioactive isotopes of cobalt, is attached to the mud pipe. The beam of rays penetrates the pipe and falls on another device which measures the intensity and indicates the results on a special scale.

The application of isotopes has permitted improved control of the operation of the suction dredge by ensuring that the proper mixture of mud pulp is flowing through the pipe. (Kiev, Pravda Ukrainy, 14 Dec 58)

Headed by K. Shaposhnikov, Candidate of Technical Sciences, the Chair of Automatics of the Taganrog Radio Engineering Institute is devoting considerable effort to the development of new systems for radio control of industrial installations. The first such system has successfully undergone testing at the Polazna oil fields, where oil is being taken from the bottom of the Kama Sea.

This system permits a single dispatcher to control 50 oil wells at distances up to 20 km. Appropriate instruments automatically determine the pressure in the wells and the level of oil in tanks, control the operation of deep-well pumps, and also signal abnormal operation of equipment.

The chair has installed six such systems in the oil fields of the Permskiy Sovnarkhoz.

In contrast to all previous radio control systems, those developed by the Taganrog scholars do not require expensive equipment.

The scientists of the chair have successfully filled orders from the petroleum workers of Krasnodarskiy Kray, for whom they have developed an improved system of radio control for petroleum gathering points. Such a system is currently being developed for the Ukhta Petroleum Combine in the Komi ASSR.

The chair has also proposed a new system of radio control which permits a single operator to control the fans of the main ventilation systems of coal mines at distances up to 5 km. Semiconductors will be used in this new apparatus. (Moscow, Promyshlenno-Ekonomicheskaya Gazeta, 21 Jan 59)

The Leninakan Instrument Making Plant is the producer of the RV-7 viscosimeters, which are used for determining the viscosity of oil. These instruments are used in many cities of the USSR, although the plant began producing them only about 2 months ago.

The plant was created in 1957 out of the former "Pokhpat" Metalworking Artel, and was equipped with modern machine tools. In December 1958, its new building was put into operation; by the end of the Seven-Year Plan, two more large buildings will be constructed.

The plant's technical division is developing a new drafting unit, which will be lighter and cheaper than currently produced units. During the Seven-Year Plan, the plant will begin making moisture meters and other general-purpose industrial instruments. (Yerevan, Kommunist, 8 Jan 59)

A portable pneumatic oscillograph has been developed at the Institute of Precision Mechanics and Optics. The new instrument has an electrical power supply and can be used for checking the operation of gas lines, ventilation ducts, and internal combustion engines. The first two instruments made at the institute are already in operation. (Leningradskaya Pravda, 23 Jan 59)

The Konotop Krasnyy Metallist Plant and the Institute of Automatics of Gosplan Ukrainian SSR have developed a new instrument for the automatic control of coal-mine development machines. Coal combines produced by the Yasinovataya Machine Building Plant will be equipped with such instruments. (Moscow, Promyshlenno-Ekonomicheskaya Gazeta, 11 Jan 59)

The current gross output of the Moscow Manometr Plant is 6.5 times as high as in 1951. The output per worker is more than 3.5 times as high as in 1951.

During the past 5 years, the plant has organized the series production of 13 modifications of types EPD, EMD, and EPID secondary instruments, which can operate with electrical, three-position, pneumatic isodrome, and rheostat transmitters with signaling units, as well as with other devices.

The plant also produces many other instruments, such as electronic automatic 12-point bridges, various manometers, rotameters, differential manometers, and relays. However, the instruments made by this plant do not fully satisfy the growing needs of industry. The plant needs to be specialized.

At present, the plant makes more than 4,000 type-sizes of instruments, including more than 570 manometric instruments and more than 2,000 electronic types. In the near future, it will develop automatic electronic

secondary instruments with improved metrological and operational characteristics, and of smaller sizes, which will replace the EPD, EMD, and EPID instruments. -- Yu. V. Feoktistov, Chief Engineer, Manometr Plant (Moscow, Priborostroyeniye, Jan 59, pp 3-4)

Electrical engineering plants of the Transsignalsvyaz'zavody [Transport Signaling and Communications Equipment Plants?] Trust produce more than 500 type-designations of complex equipment for automatic and telemechanical systems. During the Seven-Year Plan, besides making currently produced equipment, these plants are to begin making new, improved products. The Khar'kov and Losinoostrovskaya electrical engineering plants intend to organize the series production of remote-control apparatus utilizing semiconductors, contactless relays, and automatic blocking and electrical centralization equipment for electrified railroads using AC. It is intended that these two plants and the Leningrad Electrical Engineering Plant will begin the production of equipment for polarity-frequency and frequency centralized traffic control. (Moscow, Zheleznodorozhnyy Transport, Mar 59, p 14)

C. Electrical Instruments

Work on automating production and checking processes in the manufacture of electric meters is being conducted in line with the increasing rates of production of such meters in the USSR.

The Leningrad Electrical Machinery Plant has put into operation an automatic installation designed by the VNIIEP [All-Union Scientific Research Institute of Electrical Measuring Instruments]. This installation is used for adjusting electric meters. Automatic units have been installed at the Vil'nyus Electric Meter Plant and high-production adjusting stands such as those used at the Moscow Elektroschetchik Plant have been put into operation at the Mytishchi Electric Meter Plant. Automatic stands of the Moscow Electrical Machinery Plant are used for the state testing of three-phase electric meters.

A group of engineers and mechanics of the Moscow Elektroschetchik Plant have developed an automatic unit for single-phase meters, which represents a great step forward in the production of meters. The meter errors in relation to the established tolerances are given automatically: two signal lamps of different colors light up to show errors.

(Source gives additional details on the new automatic meter-checking unit.) (Moscow, Izmeritel'naya Tekhnika, Mar 59, p 32)

The Mytishchi Electric Meter Plant of the Moscow Oblast Sovnarkhoz has begun series production of the type SO-42 household electric meters. These meters are hooked directly into a 127- or 220-volt, 50-cycle, single-phase AC circuit and are rated for loads of 5, 10, or 20 amp.

The precision class (2.0) of the SO-42 is higher than that of old models. The new meter can tolerate a sustained load of up to 400 percent of rated capacity, as compared with 150-200 percent for the SO-1 and the SO-2.

The SO-42 meters are distinguished for their long service life. The large capacity of 7,000 hours at normal load makes it possible to take readings at intervals up to 2 months apart.

The meters measure 207 x 135 x 105 mm, weigh 1.4 kg, and sell for 170 rubles. (Moscow, Novyye Tovary, No 3, 1959, p 5)

D. Geophysical Apparatus

During the Seven-Year Plan, the Riga Gidrometpribor Plant will increase its production of hydrometeorological and aerological instruments to 2.4 times the current output. The plant recently started production of an original semiautomatic instrument for processing signals from radiosondes. This instrument was developed by scholars of the Moscow Scientific Reseaech Institute of Hydrometeorological Instruments, in collaboration with plant designers. It employs electromagnets and semiconductors. It will simultaneously process data on the pressure, moisture content, and temperature of the air in the vicinity of the radiosonde, supplying precise information within 8-10 seconds after receiving the raw signals. The plant is currently completing assembly of the first 20 of these semiautomatic instruments, one of which will be sent to the exposition in New York. (Riga, Sovetskaya Latviya, 20 Jan 59)

Production of the BM-1 combination barometer-thermometer-hygrometer has begun in Riga. (Kiev, Rabochaya Gazeta, 15 Jan 59)

The Moscow Experimental Control and Measuring Instrument Plant has produced a new instrument (10) for determining the acidity and alkalinity of soil. It was developed by the Central Design Bureau for Food Machinery Manufacture and Instrument Making.

The new instrument can check ten sample vessels of soil simultaneously. (Moscow, Promyshlenno-Ekonomicheskaya Gazeta, 4 Jan 59)

(10) Photo available in source, p 3, top

E. Medical Equipment

An exhibition of electronic medical equipment has opened at the Central Club of the Soviet Army in honor of the first USSR conference on the use of electronics in medicine. More than 90 electronic instruments and apparatuses were exhibited; 28 of these are series-produced in USSR industry. (Moscow, Vechernyaya Moskva, 6 Jan 59, p 2)

Workers of the "Biofizpribor" Design and Technological Bureau have made a model of a universal complex electrocardiograph. It is equipped with five instrument attachments, including one for determining the movement of the chest cage of a person which in turn depends on the activity of his heart, and an electrical manometer for the continuous measurement of blood pressure. The cardiograph can simultaneously record up to five of the 23 processes characterizing the work of the heart and blood vessels in various combinations. This is the first such apparatus in the world. The experimental model has been given a high appraisal in Leningrad clinics. (Leningradskaya Pravda, 14 Jan 59)

Among a number of unique instruments currently being supplied by the radioelectronics industry for Soviet medical use is the new UZD-4 apparatus (11), which was designed and built by the All-Union Scientific Research Institute of Medical Instruments and Equipment. The "heart" of this apparatus is an ultrasonic wave generator which aids in the detection of malignant tumors in the human body. Its chief advantage lies in its ability to detect tumors in their earliest stages, when they are too small even to be detected by X rays. (Kiev, Rabochaya Gazeta, 22 Jan 59)

(11) Photo available in source, p 4, center

The FFS-01 photophono-stimulator was developed in the USSR for the first time by the "Biofizpribor" Independent Design and Technological Bureau, according to the specifications of the Institute of Neurosurgery imeni Burenko. This instrument is used for the early detection of brain ailments.

(Source gives additional information on the FFS-01.) (Moscow, Priborostroyeniye, Feb 59, p 27)

F. Testing Equipment

Testing has been successfully completed on a Roentgen spectrograph developed at the Khar'kov Electrical Machinery Plant which is used for determining the chemical composition of various metals and alloys by

means of X rays. A few milligrams of the substance being tested are sufficient for an analysis. The principle of operation of this instrument is based on the excitation of various spectra of the X rays with respect to the chemical and other properties of the materials. These rays are projected by the instrument onto a sensitive film, where, after development, they appear as spectral lines.

This Roentgen spectrograph permits much more delicate research than was formerly possible. (Kiev, Pravda Ukraina, 14 Dec 58)

Two instruments based on semiconductors have been developed at the Khar'kov Polytechnic Institute imeni V. I. Lenin. Both are designed for accelerating checking of the dynamic strength of machine parts. One is a central station for measuring deformation by the string method; the other is a frequency meter or electronic tachometer.

The central station has a built-in calibration frequency oscillator with five frequency subbands, and can determine the vibration of the transmitter string by "zero-beating" in a band from 410 to 1,850 cycles per second.

The frequency meter operates in a band from 5 to 18,000 cycles per second and has 11 subbands. Since it is supplied from a battery, it can be used anywhere. The meter is rendered universal by having a set of different transmitters. It can be used for measuring electrical oscillations. It can also be used as a string dynamometer or a tachometer. (Moscow, Promyshlenno-Ekonomicheskaya Gazeta, 9 Jan 59)

G. Watchmaking

The Special Design Bureau of the Timepiece Industry, in collaboration with the Moscow Timepiece Plant No 2, has begun the development of an automatic shop for the production of mounting plates of timepiece mechanisms. All operations will be carried out by automatic machine tools without any human operators. The first 18-position machine tools (12) for the automatic shop are being checked. (Minsk, Sovetskaya Belorussiya, 23 Jan 59)

(12) Photo available in source, p 1, top

VI. PHOTOGRAPHIC AND MOTION-PICTURE EQUIPMENT

The Scientific Research Institute of Electrography of the Lithuanian Sovnarkhoz has developed machines for the production of semiconductor paper, and an electrographic duplicating apparatus. The new photographic paper does not contain silver, and images form on it with the use of electric current. This method of photoreproduction is much cheaper and faster than former methods for reproducing diagrams, texts, and pictures. (Moscow, Izvestiya, 23 Jan 59)

The price of the Smena-3 camera is 170 rubles. The price of the Smena-4 camera is 210 rubles. (Moscow, Byulleten' Roznichnykh Tsen, No 3, Jan 59, p 11)

The UP-2 photographic enlarger is made in the Tul'skiy Sovnarkhoz and costs 375 rubles. (Moscow, Novyye Tovary, No 2, 1959, p 3)

During 1959, the Moscow Moskinap Plant intends to master the production of silent 35-mm motion-picture cameras of the KSN type, based on the SK type cameras.

The Lenkinap (Leningrad Kinap) Plant is mastering the production of a new semiconductor-based universal amplifying unit developed in collaboration with NIKFI [All-Union Scientific Research Motion-Picture Photography Institute] for the reproduction of sound at mobile motion-picture installations. The plant is also mastering the production of magnetic head units for multitrack sound reproduction.

The Lenkinap Plant is expected during this year to master a whole series of new developments in motion-picture technology, including a stationary motion-picture amplifier, based on the functional unit principle and developed in collaboration with NIKFI, TsKB [Central Design Bureau], and LIKI [Leningrad Institute of Motion-Picture Engineers]; motion-picture camera lenses with focal lengths of 16, 150, 200, and 300 mm; anamorphotic lens units for type SK-1 and KSK cameras; and anamorphotic supplementary lens and a 35-mm focal length lens for the type TKS-3 trick movie camera; and a series of lenses for wide-format motion-picture cameras.

The Odessa Kinap Plant is starting production of modernized Ukraina motion-picture projectors with magnetic-tape sound reproduction, and plans to master the production of a new universal clipping-room bench (montazhnyy stol) which meets modern requirements and a duplication machine (mul'tstanok) during 1959.

This year, the Kiev Kinap Plant is mastering the production of simplified time-sequence (khronikal'nyy) illumination devices designed by MKBK [Moscow Motion-Picture Apparatus Design Bureau] which have mirror lamps.

The Samarkand Kinap Plant plans to master during 1959 the production of a type SNS-1.25 voltage stabilizer, which was designed in collaboration with NIKFI and is used for supplying current to rural motion-picture installations. This plant is also planning to master the production of new stationary amplifying equipment for motion-picture theaters, types 10-UDS-3 and 10-UDS-4, designed in collaboration with NIKFI.

This year, the Moscow KEMZ [Cinema Electrical Machinery Plant] is expected to undertake production of sensitometer apparatus, the type TsS-2 sensitometer and the type TsD-7 densitometer, for checking color film and its processing, based on the work of NIKFI. This same plant is expected during 1959 to master the production of meters for measuring the color brightness of small parts of frames (kadr), which were developed by NIKFI together with MKBK and designed for checking illumination during filming. (Moscow, Tekhnika Kino i Televideniya, Feb 59, pp 2-3)

[Comment: It is uncertain whether the phrase "this year," used above, refers to 1958 or 1959, since the material in this issue was submitted for publication on 11 December 1958.]

The advantages of 16-mm film, as well as the experience of many foreign and domestic television centers, demonstrate the advisability of utilizing 16-mm film apparatus on a wide scale in the television centers of the Soviet Union.

In this connection, NIKFI developed the TK-16 television-type motion-picture projector (13) in 1957.

The TK-16 is designed for projecting 16-mm sound film, with either photoelectric or magnetic sound tracks, onto the light-sensitive layer of vidicon type tubes. (Moscow, Tekhnika Kino i Televideniya, Feb 59, p 60)

(13) Photo available in source, p 61

The Leningrad Kinap Plant, in collaboration with the Central Design Bureau of the Ministry of Culture, has developed a new set of four-track equipment for magnetic sound recording during the filming of wide-screen stereophonic movies. The equipment will soon be sent to the Lenfil'm Studio, where it will be used for making the new movie "Podnyataya Tselina." (Leningradskaya Pravda, 9 Jan 59)

Designers at the Odessa Kinap Plant have developed the new Ukraina-4 motion-picture projector with provision for use with a magnetic tape recorder, thus permitting films to be rapidly converted for use with any of the languages of the USSR. Plant engineers are currently completing development of methods for manufacturing these new projectors.

The small-series shop of this plant has already produced the first series of 35-GM-2 hydrotype film printing machines.-- A. Karal'nik, Chief Designer, Odessa Kinap Plant (Kiev, Rabochaya Gazeta, 3 Feb 59)

VII. ELECTRICAL PRODUCTS

The 1958 gross output of the Tashkent Tashkentkabel' Plant is now more than double that of 1955 in the same production space. During the past 3 years, it mastered the production of more than ten types of new products. In 1958, it had a profit of 23 million rubles. Its products are used for new blast furnaces, for the electrification of the Trans-Siberian Railroad, for huge electric power stations, and for the extraction of Yakutian diamonds. They are sent to all People's Democracies and to India, Afghanistan, Burma, Pakistan, Iran, and the UAR. The plant's rolling mill rolls up to 2,100 ingots of aluminum per shift, as compared with 1,250 ingots per shift at the Kirs Kirskabel' Plant.

The plant has a heavy flexible cable shop (14). It is the first plant to develop two continuous vulcanizing units for heavy flexible cables up to 100 mm in diameter. It has mastered the production of rubber strippers for cotton-picking machines.

For several years, the Scientific Research Institute of the Cable Industry has been located at the Tashkentkabel' Plant. The institute has developed heat-resistant electrical coring cable for the oil industry. The Soviet cables of this type are as good as any made by the famous Halliburton firm of the US and the Perelli firm of Italy.

I. Z. Shabadash, chief of the Technological Division of the Institute, states that the institute has developed ground drill cable which can tolerate an 8-ton load without stretching. It has also developed cable for medium- and high-power petroleum pumps. Soon the Belgorod and Kursk ore deposits will be supplied with extralarge- gauge cable with corrugated sheathing developed by the institute, which will be used in pumping water out of special mineshafts. The institute has also developed high-voltage mine cable for mobile power substations.

The plant and institute have well-defined production structures. They provide for the needs of the petroleum, mining, fuel, and ferrous metallurgical industries and of railroads.

The plant is already making use of polyvinyl chloride, "ftoroplast" [fluorine plastic], and polyethylene for covering cables. A ton of polyvinyl chloride costs 1,600 rubles and replaces 6 tons of lead, 2 tons of copper, and 50 kg of yarn, amounting to 50,000 rubles.

During the past 2 years, party member Konstantin Ivanovich Kostygov, chief engineer of the plant, was in China, where he helped to put a large cable plant into operation in Mukden.

The Tashkentkabel' Plant is the only USSR supplier of trolley wire for the electrification of railroads. The plant is thinking of making trolley wire out of steel and aluminum instead of copper. The days of using rubber at the plant are numbered; plastics are being used on an ever-increasing scale. (Tashkent, Pravda Vostoka, 16 Jan 59)

(14) Photo available in source, p 2, top

Beyond a grove where gardens and fields begin are two buildings surrounded by a stone wall. These buildings are occupied by the Leninakan Electrical Engineering Plant, which produces electric welding equipment for shipment to all parts of the USSR and to foreign countries. This enterprise went into operation in March 1958. Its press shop is equipped with eccentric and automatic presses and guillotine shears. Its machine shop is equipped with modern machinery. Welding equipment is assembled on a stand in the assembly shop.

In the near future, the plant will begin preparing for the production of the type STN-500 welder, coils for fluorescent lamp fixtures, and other products. A second stage of the plant will be built during the Seven-Year Plan, at which time its output will be quintupled. (Yerevan, Kommunist, 14 Jan 59)

The machine shop of the Vil'nyus Electric Welding Equipment Plant is large and spacious (15). (Vil'nyus, Sovetskaya Litva, 10 Jan 59)

(15) Photo available in source, p 2

The Moscow Daylight Lamp Plant of the Administration of the Metelworking Industry [of the Moscow City Soviet] produces the series ODL fluorescent light fixtures. (Moscow, Svetotekhnika, Mar 59, p 32)

Since 1958, the Leningrad Electrical Engineering Plant of the Ministry of Railways has been producing two types of miniature relays: enclosed plug-in types and open nonplug types.

(Source gives additional data and pictures of these relays.) (Moscow Transportnoye Stroitel'stvo, Mar 59, p 21)

* * *